December 16, 2002

Subject: Changes in VOC Analytical Requirements

Dear Sir or Madam:

The Department of Environmental Services (Department) is changing its requirements for volatile organics analyses for site investigations and remediation at petroleum and hazardous waste contaminated sites. These changes are a result of discussions with New Hampshire-accredited environmental laboratories to address issues of target analytes and quantitation limits at the various phases of the site remediation process. We are writing to inform you of these revisions that the Department will implement in the Spring of 2003. These changes will have an effect on the analytical services that you request for soil, groundwater and drinking water samples obtained at New Hampshire contaminated sites.

The Department will no longer reference an EPA analytical method to be used but instead will specify a standardized list of analytes along with reporting requirements and detection limits that must be achieved. In the future the Department will specify one of three standardized lists of analytes (attached) when requesting volatile organic compound (VOC) analyses:

1) Petroleum & Hazardous Waste Remediation Full List of Analytes
2) Petroleum Remediation Short List of Analytes
3) Hazardous Waste Remediation Short List of Analytes

Any EPA approved VOC analytical method and the quality controls specified in the method may be used for the analyses of the listed analytes, provided the method meets the requirements outlined in the footnotes of each list. As you know, there are a variety of analytical methods commonly used for VOC analysis for soil, groundwater and drinking water, each with its own list of analytes. These Department standardized lists will avoid the confusion on the required analytes caused by referencing a specific EPA analytical method.

These standardized lists and the reporting requirements are being provided to New Hampshire–accredited environmental laboratories, and will take effect on April 1, 2003. Analyses performed at petroleum and hazardous waste contaminated sites after that date should be performed and reported in accordance with these requirements. These changes have resulted in the amendment of the Department's table of "Recommended Analytical Methods for Petroleum Contaminated Sites." Please find enclosed a copy of the amended table for your reference. Also, you will find enclosed a sample "Chain-of-Custody" sheet. This example shows the information needed by the laboratory to meet these new reporting requirements.

Please note that these requirements apply only to soil, groundwater and drinking water samples obtained for contaminated site investigations and remediation. Samples collected for the

Wastewater, Watershed Management and Public Drinking Water programs should continue to be analyzed using the methods designated by the respective programs.

We welcome your comments as we strive to improve how we investigate and clean up contaminated sites in New Hampshire. If you have any questions or comments, please do not hesitate to contact George Lombardo, P.E. of the Waste Management Division at (603) 271-3645, or Pat Bickford, Laboratory Administrator at (603) 271-3233.

Sincerely,

Frederick J. McGarry, PE, DEE
Chief Engineer
Site Remediation Programs

Cc: Philip J. O'Brien, Ph.D., Director, DES Waste Management Division
Harry Stewart, PE, Director, DES Water Division
Pat Bickford, DES Laboratory Administrator
George Lombardo, PE, Administrator, ORCB
Carl Baxter, PE, Administrator, HWRB

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
PETROLEUM & HAZARDOUS WASTE REMEDIATION
FULL LIST OF ANALYTES FOR VOLATILE ORGANICS

		Quantitation Limit					Quantitation Limit		
		Ground-water	Drinking Water	Soil			Ground-water	Drinking Water	Soil
Compound	CAS#	ug/L	ug/L	ug/Kg	Compound	CAS#	ug/L	Ug/L	ug/Kg
1,1,1,2-Tetrachloroethane	630-20-6	5	0.5	100	Chlorobenzene	108-90-7	5	0.5	100
1,1,1-Trichloroethane	71-55-6	5	0.5	100	Chloroethane	75-00-3	5	0.5	100
1,1,2,2-Tetrachloroethane	79-34-5	2	0.5	100	Chloroform	67-66-3	5	0.5	100
1,1,2-Trichloroethane	79-00-5	5	0.5	100	Chloromethane	74-87-3	3	1	100
1,1-Dichloroethane	75-34-3	5	0.5	100	cis-1,2-Dichloroethene	156-59-2	5	0.5	100
1,1-Dichloroethene	75-34-4	5	0.5	100	cis-1,3-Dichloropropene	124-48-1	5	0.5	100
1,1-Dichloropropene	563-58-6	5	0.5	100	Dibromochloromethane	124-48-1	5	0.5	100
1,2,3-Trichlorobenzene	87-61-6	5	0.5	100	Dibromomethane	74-95-3	5	0.5	100
1,2,3-Trichloropropane	96-18-4	5	0.5	100	Dichlorodifluoromethane	75-71-8	5	0.5	100
1,2,4-Trichlorobenzene	120-82-1	5	0.5	100	Diethyl ether	60-29-7	5	0.5	100
1,2,4-Trimethylbenzene	95-63-6	5	0.5	100	Diisopropyl ether (DIPE)	108-20-3	5	0.5	100
1,2-Dibromo-3-chloropropane	96-12-8	5	0.5	100	Ethylbenzene	100-41-4	5	0.5	100
1,2-Dibromoethane	106-93-4	5	0.5	100	Ethyl-t-butyl ether (ETBE)	637-92-3	5	0.5	100
1,2-Dichlorobenzene	95-50-1	5	0.5	100	Hexachlorobutadiene	87-68-3	2	0.5	100
1,2-Dichloroethane	107-06-2	5	0.5	100	Isopropylbenzene	98-82-8	5	0.5	100
1,2-Dichloropropane	594-20-7	5	0.5	100	m/p-Xylenes	1330-20-7	5	0.5	100
1,3,5-Trimethylbenzene	108-67-8	5	0.5	100	Methylene chloride	75-09-2	5	0.5	100
1,3-Dichlorobenzene	541-73-1	5	0.5	100	Methyl-t-butylether(MTBE)	1634-04-4	5	0.5	100
1,3-Dichloropropane	142-28-9	5	0.5	100	Naphthalene	91-20-3	5	0.5	100
1,4-Dichlorobenzene	106-46-7	5	0.5	100	n-Butylbenzene	104-51-8	5	0.5	100
2,2-Dichloropropane	594-20-7	5	0.5	100	n-Propylbenzene	103-65-1	5	0.5	100
2-Butanone(MEK)	78-93-3	10	10	500	o-Xylene	95-47-6	5	0.5	100
2-Chlorotoluene O-Chloro	95-49-8	5	0.5	100	p-Isopropyltoluene	99-87-6	5	0.5	100
2-Hexanone	591-78-6	10	0.5	100	sec-Butylbenzene	135-98-8	5	0.5	100
2-Methoxy-2-methylbutane (TAME)	994-05-8	5	0.5	100	Styrene	100-42-5	5	0.5	100
4-Chlorotoluene P-Chloro	106-43-4	5	0.5	100	tert-Butanol (TBA)	75-65-0	50	50	2500
4-Methyl-2-pentanone(MIBK)	108-10-1	10	10	500	tert-Butylbenzene	98-06-6	5	0.5	100
Acetone	67-64-1	10	10	500	Tetrachloroethene	127-18-4	5	0.5	100
Benzene	71-43-2	5	0.5	100	Tetrahydrofuran(THF)	109-99-9	10	10	500
Bromobenzene	108-86-1	5	0.5	100	Toluene	108-88-3	5	0.5	100
Bromochloromethane	74-97-5	5	0.5	100	trans-1,2-Dichloroethene	156-60-5	5	0.5	100
Bromodichloromethane	75-27-4	2	0.5	100	trans-1,3-Dichloropropene	542-75-6	5	0.5	100
Bromoform	75-25-2	5	0.5	100	Trichloroethene	79-01-06	5	0.5	100
Bromomethane	74-83-9	5	0.5	100	Trichlorofluoromethane	75-69-4	5	0.5	100
Carbon disulfide	75-15-0	5	0.5	100	Vinyl chloride	75-01-4	2	0.5	100
Carbon tetrachloride	56-23-5	5	0.5	100					

Notes:

1) Samples shall be analyzed by an approved EPA analytical method. The method shall be capable of detecting concentrations at or below quantitation limits, expect as noted in 4 below.
2) The initial samples for a new site or a new discharge at an existing site must be analyzed by an approved EPA method that uses mass spectrometry for positively identifying the compounds.
3) For initial samples that exhibit non-listed analytes, the top ten tentatively identified compounds (TICs) must be qualified and, if possible, quantitated. If there are no non-listed analytes present in the chromatogram, this should be noted in the report narrative. Reporting of TICs is not required for residential and commercial On-Premise-Use Heating Oil Facilities sites.
4) Detecting concentrations at or below the quantitation limit is not required for all listed compounds when analyzing for highly contaminated groundwater or soil samples (collected in the vicinity of the contaminant source area). However, the analytical method shall be capable of reporting the actual concentrations of all critical compounds (compounds used to make regulatory decisions). Other compounds may be reported as less than a concentration, provided those compounds are not used in the regulatory decision-making process. A second analysis of a sample (dilutions series analysis to obtain high concentrations of some compounds and low concentrations of other compounds) are only required when specifically requested by a DES project manager. The Petroleum Cleanup Funds will only reimburse multiple analyses of a single sample when specifically requested by a DES project manager and reimbursement will be in accordance with the prevailing market rates document published by DES.
5) For the purposes of site closure, the analytical method shall be capable of detecting concentrations at or below the quantitation limits for all compounds on the list.
6) DES may require 1,3,5-Trichlorobenzene (CAS # 108-70-3, quantitation limits: groundwater=5 ppb, drinking water=0.5 ppb, soil=100 ppb) be reported as part of the full list of analytes, if this analyte is detected as a TIC or site history indicates the compound is present at the site.

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
PETROLEUM REMEDIATION
SHORT LIST OF ANALYTES
FOR
VOLATILE ORGANICS

		Quantitation Limit	
		Groundwater	Soil
Compound	CAS #	ug/L	ug/Kg
1,2,4-Trimethylbenzene	95-63-6	5	100
1,3,5-Trimethylbenzene	108-67-8	5	100
2-Methoxy-2-methylbutane (TAME)	994-05-8	5	100
Benzene	71-43-2	5	100
Diisopropyl ether (DIPE)	108-20-3	5	100
Ethylbenzene	100-41-4	5	100
Ethyl-t-butyl ether (ETBE)	637-92-3	5	100
Isopropylbenzene	98-82-8	5	100
m/p-Xylenes	1330-20-7	5	100
Methyl-t-butylether(MTBE)	1634-04-4	5	100
Naphthalene	91-20-3	5	100
n-Butylbenzene	104-51-8	5	100
n-Propylbenzene	103-65-1	5	100
o-Xylene	95-47-6	5	100
p-Isopropyltoluene	99-87-6	5	100
sec-Butylbenzene	135-98-8	5	100
tert-Butanol (TBA)	75-65-0	50	2500
tert-Butylbenzene	98-06-6	5	100
Toluene	108-88-3	5	100

Notes:

1) Samples shall be analyzed by an approved EPA analytical method. The method shall be capable of detecting concentrations at or below the quantitation limits, except as noted in 3 below.
2) The Short List may be used after DES Project Manager approval. The Short List cannot be used in the following cases:
   i. initial samples for a new site or a new discharge at an existing site,
   ii. samples collected for one of the two final rounds necessary to document site closure, and
   iii. samples collected from drinking water supplies.

   The Full List of Analytes shall be reported for the above cases.
3) Detecting concentrations at or below the quantitation limit is not required for all the listed compounds, when analyzing for highly contaminated soil or groundwater samples (collected in the vicinity of the contaminant source area). However the analytical method shall be capable of reporting actual concentrations for all critical compounds (compounds used to make regulatory decisions). Other compounds may be reported as less than a concentration, provided those compounds are not used in the regulatory decision-making process. A second analysis of a sample (dilutions series analysis to obtain high concentrations of some compounds and low concentrations of other compounds) is only required when specifically requested by a DES Project Manager. The Petroleum Cleanup Funds will only reimburse multiple analyses of a single sample when specifically requested by a DES Project Manager and reimbursement will be in accordance with the prevailing market rates document published by DES.
4) For the purposes of site closure, the analytical method shall be capable of detecting concentrations at or below the quantitation limits for all compounds on the list.

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
HAZARDOUS WASTE REMEDIATION
SHORT LIST OF ANALYTES
FOR
VOLATILE ORGANICS

		Quantitation Limit	
		Groundwater	Soil
Compound	CAS#	ug/L	ug/Kg
1,1,1,2-Tetrachloroethane	630-20-6	5	100
1,1,1-Trichloroethane	71-55-6	5	100
1,1,2,2-Tetrachloroethane	79-34-5	2	100
1,1,2-Trichloroethane	79-00-5	5	100
1,1-Dichloroethane	75-34-3	5	100
1,1-Dichloroethene	75-35-4	5	100
1,2,3-Trichlorobenzene	87-61-6	5	100
1,2,4-Trichlorobenzene	120-82-1	5	100
1,2-Dichlorobenzene (o-DCB)	95-50-1	5	100
1,3-Dichlorobenzene (m-DCB)	541-73-1	5	100
1,4-Dichlorobenzene (p-DCB)	106-46-7	5	100
1,2-Dichloroethane	107-06-2	5	100
Chloroethane	75-00-3	5	100
Chloromethane	74-87-3	3	100
cis-1,2-Dichloroethene	156-59-2	5	100
Methylene chloride	75-09-02	5	100
Monochlorobenzene (Chlorobenzene)	108-90-7	5	100
Tetrachloroethene	127-18-4	5	100
trans-1,2-Dichloroethene	156-60-5	5	100
Trichloroethene	79-01-06	5	100
Vinyl chloride	75-01-4	2	100

Notes:

1) Samples shall be analyzed by an approved EPA analytical method. The method shall be capable of detecting concentrations at or below the quantitation limits, except as noted in 3 below.
2) The Short List may be used after DES Project Manager approval. The Short List cannot be used in the following cases:
   i. initial samples for a new site or a new discharge at an existing site,
   ii. samples collected for one of the two final rounds necessary to document site closure, and
   iii. samples collected from drinking water supplies.

   The Full List of Analytes shall be reported for the above cases.
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4) For the purposes of site closure, the analytical method shall be capable of detecting concentrations at or below the quantitation limits for all compounds on the list.

LOGIN AND CUSTODY SHEET

(Laboratory Policy: Samples not meeting method requirements will be analyzed at the discretion of the Laboratory.)

Program / Client ID: _____ **DES Site #:**_____

System Name:_____ **Site/Town:**_____ **Contact:**_____

Comments:_____ **Collected By & Phone#** _____

Sample Location /ID	Date/Time Sampled	# of Containers	Matrix					VOC Target Compounds (Check One)	Expected VOC Concentration Range (If Known, Circle One)	Check if cost of second VOC run is approved	Check if Mass Spectrometry is required for VOCs	Check if TICs are required for VOCs	Preservation: Unpreserved	Preservation: 4°C	Preservation: HNO_3	Preservation: H_2SO_4	Preservation: HCL	Preservation: Methanol	Other / Notes	Lab ID # (For Lab Use Only)
								☐ Full List ☐ Petroleum Short ☐ Haz. Waste Short	> 100 ppb < 100 ppb	☐	☐	☐								
								☐ Full List ☐ Haz. Waste Short ☐ Petroleum Short	> 100 ppb < 100 ppb	☐	☐	☐								
								☐ Full List ☐ Haz. Waste Short ☐ Petroleum Short	>100 ppb < 100 ppb	☐	☐	☐								
								☐ Full List ☐ Haz. Waste Short ☐ Petroleum Short	> 100 ppb < 100 ppb	☐	☐	☐								
								☐ Full List ☐ Haz. Waste Short ☐ Petroleum Short	>100 ppb < 100 ppb	☐	☐	☐								

Relinquished By_____Date and Time_____Received By_____

Relinquished By_____Date and Time_____Received By_____

Relinquished By_____Date and Time_____ Received For Laboratory By_____

Matrix: A= Air S= Soil AQ= Aqueous (Ground Water, Surface Water, Drinking Water, Waste Water) ? Other: _____ Temp °C _____

Page _____ of _____ Data Reviewed By_____ Date_____

Section No.: 22.0
Revision No.: 4
Date: 4-15-03
Page 1 of 1

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
RECOMMENDED ANALYTICAL METHODS FOR PETROLEUM CONTAMINATED SITES (see note 1)

PETROLEUM PRODUCT	WATER MATRIX			SOIL MATRIX (see note 2)		
		Recommended Analytical Methods			Recommended Analytical Methods	
	Analytes	Initial Round	All Other Samples (see notes 3 & 9)	Analytes	Initial Round	All Other Samples (see note 3)
Gasoline and similar weight product	VOC (see note 4)	Full VOC List	Full VOC List or Petroleum VOC Short List	VOC (see note 4) TPH-as Gasoline	Full VOC List (see note 8) 8015B-GRO (see note 8)	Full VOC List or Petroleum VOC Short List (see note 8) 8015B-GRO (see note 8)
No. 2, 4, 6 Fuel Oil Diesel Waste Oil(see note 5) and similar weight product	VOC (see note 4) PAH (see note 6)	Full VOC List 8310 or 525 or 8270(see note 7)	Full VOC List or Petroleum VOC Short List 8310 or 525 or 8270(see note 7)	VOC (see note 4) PAH(see note 6), TPH-as Fuel Oil As, Ba, Cd, Cr, Pb, Hg, Se, Ag (waste oil only- see note 5)	Full VOC List (see note 8) 8270 or 8310, 8015B-DRO 6010 or 7060, 7080, 7130, 7190, 7420, 7470, 7740 cold vapor, 7760	Full VOC List or Petroleum VOC Short List (see note 8) 8270 or 8310 8015B-DRO 6010 or 7060, 7080, 7130, 7190, 7420, 7470, 7740 cold vapor, 7760

VOC: Volatile Organic Compounds
TPH: Total Petroleum Hydrocarbons
MTBE: Methyl-t-butyl ether
PAH: Polyaromatic Hydrocarbons
P&T-GC/FID: Purge and Trap - Gas Chromatography / Flame Ionization Detector
TCLP: Toxicity Characteristic Leaching Procedure
AGQS: Ambient Groundwater Quality Standards
RCM Policy: NHDES Contaminated Sites Risk Characterization and Management Policy

NOTES:
(1) EPA method results must be reported to DES according to SW 846 current edition.
(2) Soils destined for off-site treatment must be analyzed in accordance with Env-Ws 412.14.
(3) Analytical methods used for all other samples must be able to detect all analytes discovered in the initial round. For the purpose of site closure, the analytical method shall be capable of detecting concentrations at or below the regulatory cleanup level.
(4) For VOC analytical methods and reporting requirements, see the footnotes in the "Petroleum and Hazardous Waste Full List of Analytes for Volatile Organics" and the "Petroleum Remediation Short List of Analytes for Volatile Organics.
(5) Metals analysis must be performed on waste oil contaminated soils. Soil standards in the NHDES RCM Policy are based on total metals. Analysis for soils destined for off-site treatment are based on TCLP.
(6) PAH analysis shall be completed on all sampling locations during the initial round of sampling for soil and water.
(7) Ion-specific analysis may be required on 8270 tests for selected compounds in order to reach detection limits that are less than the AGQS.
(8) Soil samples collected for VOC analysis shall use EPA 5035 (methonal preservation) as required in the NH DES Soil Policy.
(9) Additional field testing and laboratory analysis of geochemical indicators may be required on a site specific basis at the request of DES.

Revised June 2002